Lead Commissioner Workshop on Advanced Ethanol Production in California

August 1, 2012

Gordon Schremp
Transportation Energy Office
Fuels and Transportation Division
California Energy Commission

Please note that this WebEx session is being recorded.

Workshop Overview

- Purpose and structure of the workshop
- Primary questions of interest
- Public comments
- California Ethanol Producer Incentive Program (CEPIP) review
- Ethanol plant profitability
- Potential crush spread formula modifications
- Ethanol oversupply
- Ethanol “blend wall” – efforts to raise level to E15
- Increasing corn costs
- Drought continues
- AB118 strategic goals & biofuel investments

Purpose & Structure of Workshop

- Discuss advanced biofuel (ethanol) and the California Ethanol Producer Incentive Program (CEPIP) funding and the future role and prospects of biofuel production in California
- Gather information to assist Commissioners and staff to:
  - Evaluate policy and market drivers of commercial ethanol production,
  - Assess project and industry economics, and
  - Understand the policy implications and investments needed to spur the commercialization of advanced biofuel production in California
- Three moderated panels
  - Corn ethanol production and co-products
  - Biofuel market outlook and government policies
  - Advanced biofuel production projects in California and tie-in to existing ethanol plants

Primary Questions of Interest

- How do CEPIP funds for corn ethanol production plants accelerate commercial-scale production of advanced biofuels in California?
- When will commercial-scale, low carbon advanced biofuel production in California occur?
- What barriers impede efforts to achieve commercial-scale advanced biofuel production and what other financial incentive mechanisms might help to overcome the barriers?
- What is the contribution of corn ethanol plants in terms of jobs and economic development in California?

Primary Questions of Interest

- What is the contribution of corn ethanol plants in fulfilling policy goals such as the Low Carbon Fuel Standard?
- How much additional funding is needed for CEPIP, if any, and how much is needed for each facility?
- To what extent and when will the growth of E15 blends or other factors affect nationwide ethanol pricing and diminish the need for CEPIP incentives?
- How does the recent heat wave in the Midwest affect corn pricing and the ethanol production "crush spread" price?

Public Comments

- Lead Commissioner for Transportation will accept oral comments during the public comments portion of the workshop
- Comments may be limited to 5 minutes per speaker
- Any comments will become part of the public record in this proceeding
- Written comments should be submitted to the Dockets Unit by 5 p.m. on August 17, 2012
- Written comments will be also accepted at the workshop
- Two comment periods
  - Before lunch
  - Conclusion of panel discussions

CEPIP Review

- Purpose of the program is to provide a process for California biorefiners to reduce their environmental footprint
- Program will result in reduced greenhouse gas emissions from California facilities
- Program will initiate a transition away from food crops and result in an increased use of local waste-based or energy crops
- Provide payments to California ethanol producers under specific unfavorable market conditions
- In return, require reimbursement by participants to the PIP Trustee of any outstanding PIP payment balances under specifically identified favorable market conditions
- No other program in the United States has these unique attributes

CEPIP Review

- The 2008-2009 FY Investment Plan cycle allocated $6 million for this funding solicitation
- Three California facilities participating in CEPIP
  - Aemetis Keyes facility
  - Calgren Pixley facility
  - Pacific Ethanol Stockton facility
- Nearly $6 million CEPIP payments to date
  - Initial payment occurred January 2011
  - Initial funding exhausted within three months
  - No additional funding provided beyond initial solicitation
- No reimbursement for CEPIP payments to date
  - Sustained unfavorable market conditions
  - Excess domestic ethanol supply & high feedstock costs

Ethanol Plant Profitability

- Ethanol plant profitability dictated by changing market conditions
  - Corn prices (costs) primarily impacted by
    - End-of-season inventory levels
    - New crop projections
  - Ethanol prices (revenue) primarily impacted by
    - Excess production capacity
    - Changing demand
- Additional revenue streams provide important income
  - Wet distillers grain (WDG)
  - Corn oil
- Ethanol plant profitability has recently declined
  - Has resulted in temporary closure of some U.S. ethanol plants
  - Nearly 9 percent of U.S. production capacity

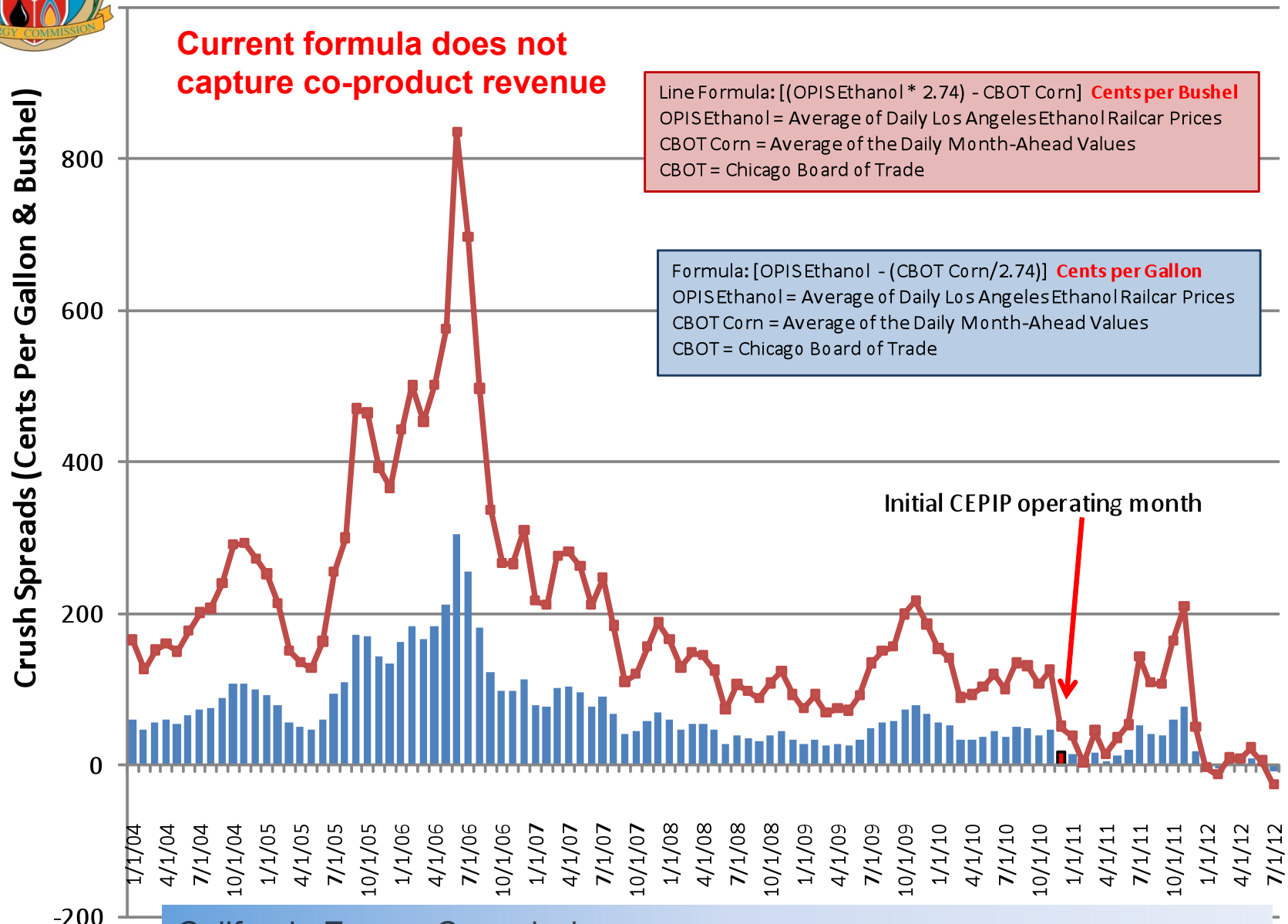
Ethanol Crush Spread

- Ethanol "crush spread" is one measure of fluctuating profitability
  - Essentially a difference between ethanol revenue and corn costs
  - One bushel of corn can be converted to 2.74 gallons of ethanol
- Current crush spread formula

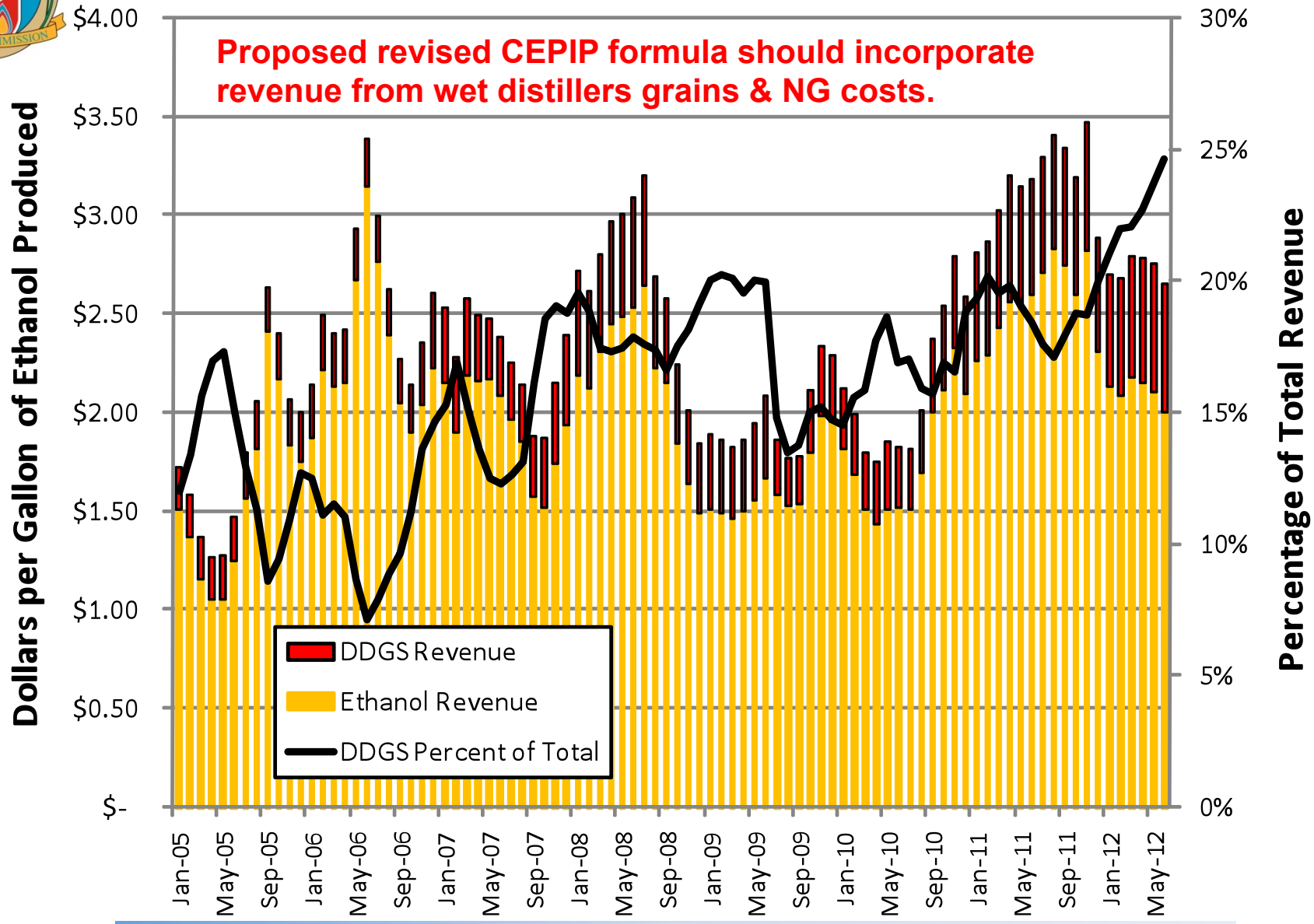
Formula: [OPIS Ethanol - (CBOT Corn/2.74)] **Cents per Gallon**
OPIS Ethanol = Average of Daily Los Angeles Ethanol Railcar Prices
CBOT Corn = Average of the Daily Month-Ahead Values
CBOT = Chicago Board of Trade

- Formula does not account for additional revenue and costs
  - WD revenue far exceeds natural gas costs

CA Ethanol Crush Spread – Under Pressure

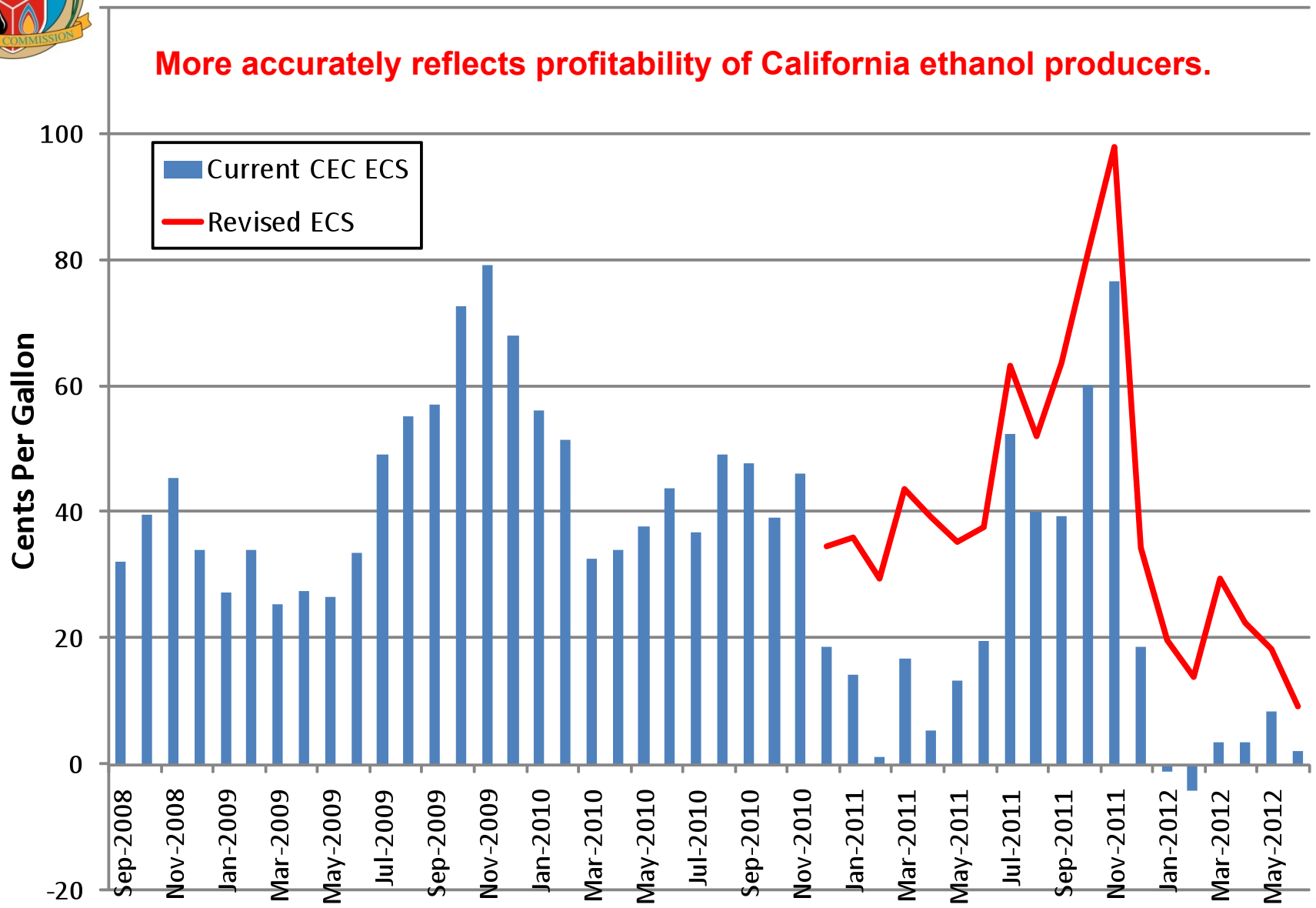


U.S. Growing Importance of DGS Revenue



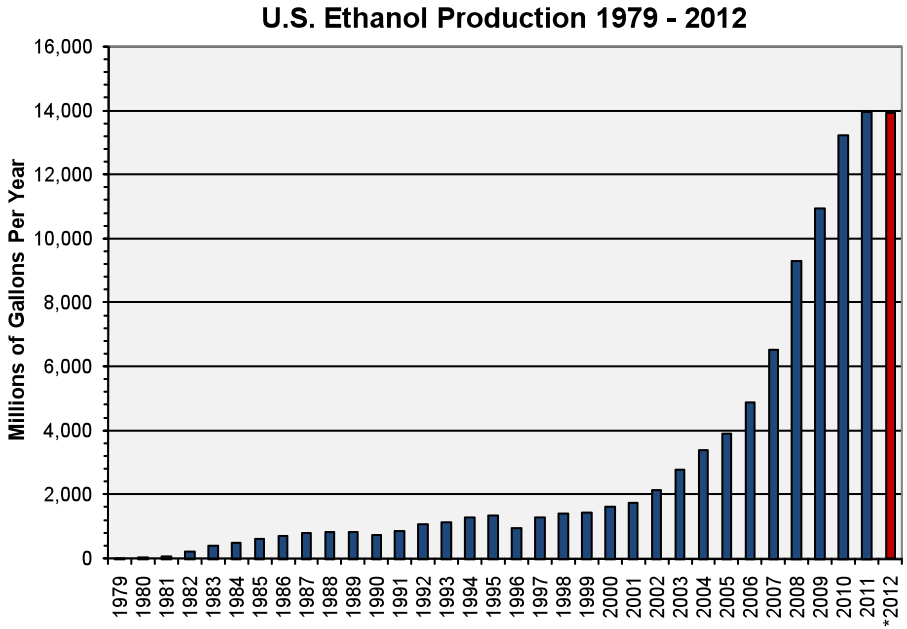
Ethanol Crush Spread – Revised Formula

More accurately reflects profitability of California ethanol producers.

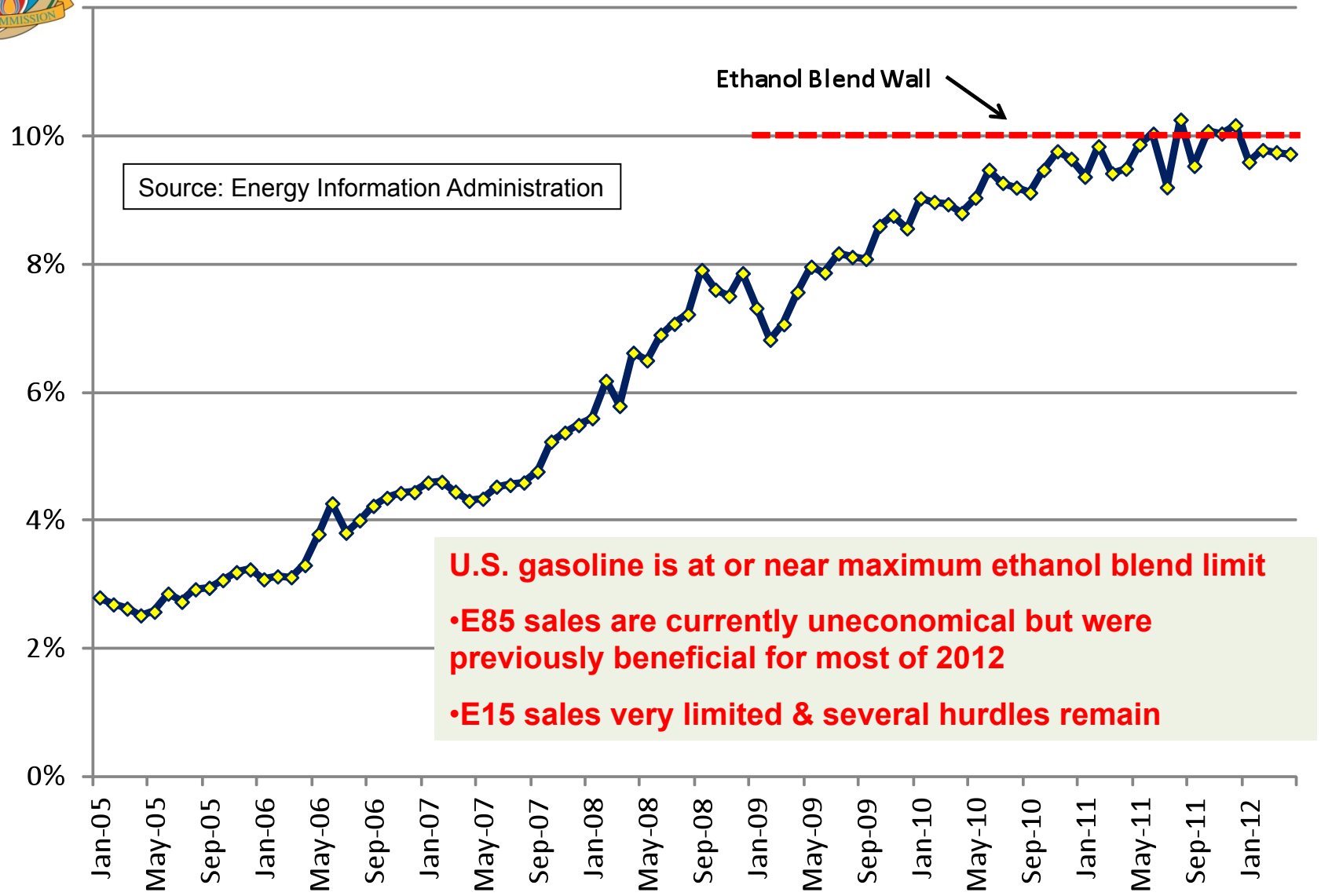


Ethanol Oversupply

- Ethanol production in the United States has been growing
  - Federal and state mandates
  - Transition away from MTBE
- Will plateau
  - RFS2 limit
  - Declining gasoline demand
  - Current 10 percent limit
- Excess supply has resulted
  - Lower market-clearing prices
  - U.S. has transitioned to net exporter
- Negatively impacted ethanol producers' profitability



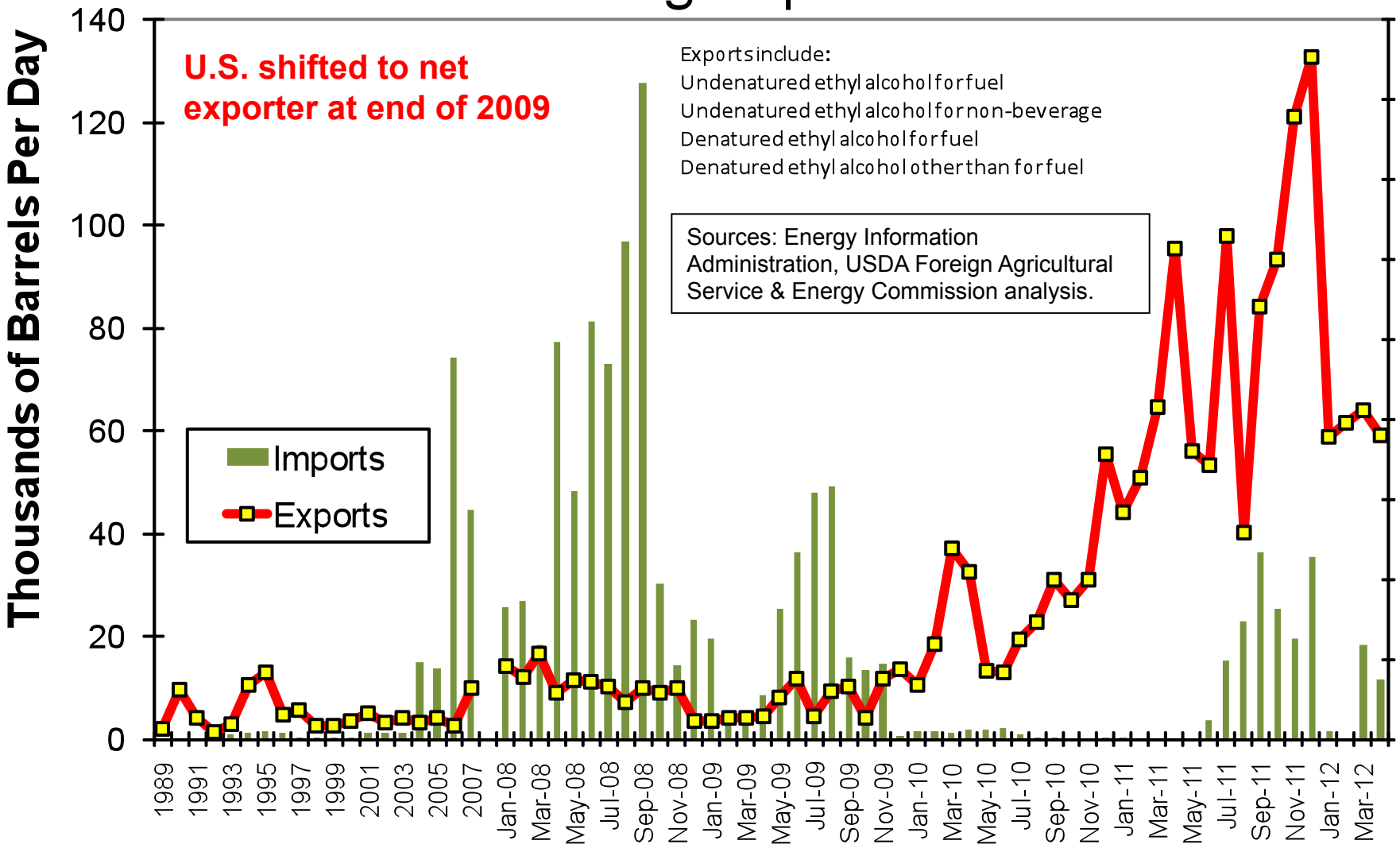
U.S. Ethanol Concentration in Gasoline



U.S. gasoline is at or near maximum ethanol blend limit

- **E85 sales are currently uneconomical but were previously beneficial for most of 2012**
- **E15 sales very limited & several hurdles remain**

U.S. Imports & Exports Ethanol 1989 through April 2012



Ethanol Blend Wall

- On March 6, 2009, Growth Energy and 54 ethanol producers requested U.S. EPA to allow for higher blends of ethanol in gasoline – greater than the 10 percent "blend wall"
- U.S. EPA issued decision of partial waiver approval on October 13, 2010 – not a requirement to use E15
- Approval limited to light-duty vehicles & medium-duty passenger vehicles, MY2001 and newer
  - 67.2 percent of existing car and light truck fleet for 2011
  - Excludes MY2000 and older vehicles, marine engines, motorcycles, heavy-duty vehicles, and non-road equipment

TABLE VI.C.3–1—PROJECTED POPULATION OF CARS AND LIGHT TRUCKS BY MODEL YEAR IN 2011

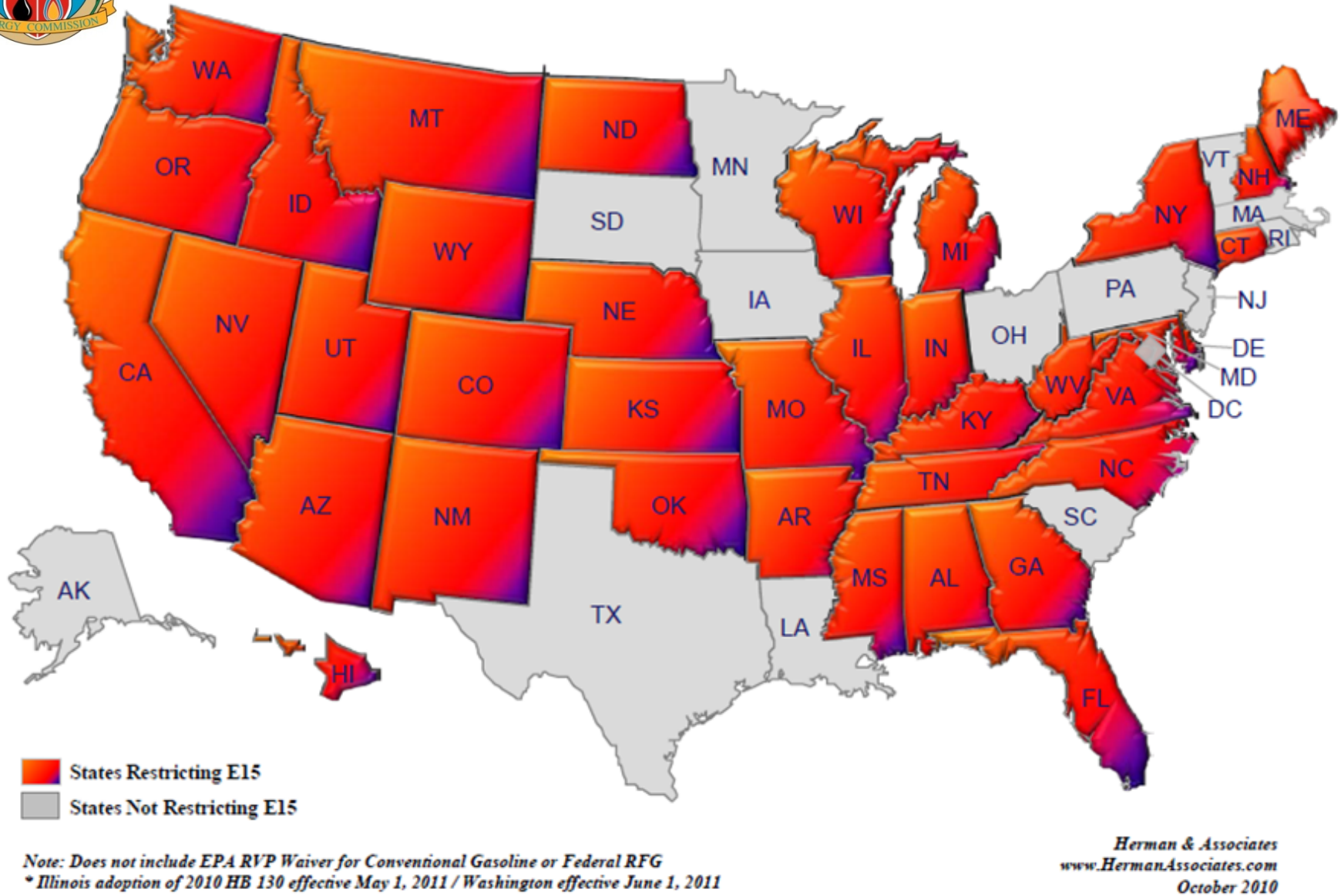
Model year	Cars	Light trucks	Cars and trucks combined	Cumulative total
2000 and earlier	41,548,800	32,162,084	73,710,884	73,710,884
2001–2006	46,567,413	38,594,752	85,162,165	158,873,049
2007–2011	39,068,213	26,755,598	65,823,812	224,696,860
Total	127,184,425	97,512,435	224,696,860	

Source: EPA's vehicle certification data and Mobile Vehicle Emissions Simulator (MOVES) model.

E15 – Recent Events & Potential Demand

- U.S. EPA approves E15 misfueling mitigation plans – June 15
  - 56 E15 registration applications approved through July 13
- Retail E15 sales begin at service station – July 11
  - Zarco 66 station located in Lawrence, Kansas is first in nation
- Theoretical maximum incremental ethanol demand volume in excess of 4.0 billion gallons
  - 2011 ethanol use in U.S. approximately 13.1 billion gallons
  - 2011 exports exceeded 900 million gallons
    - Would require 25 percent penetration to eliminate exports
- Volume will not quickly approach this higher quantity for several reasons...

37 States With E15 Blending Restrictions



Note: Does not include EPA RVP Waiver for Conventional Gasoline or Federal RFG
** Illinois adoption of 2010 HB 130 effective May 1, 2011 / Washington effective June 1, 2011*

Herman & Associates
www.HermanAssociates.com
October 2010

E15 – Specific State Restrictions

VOLUME BLENDING CAPS	OXYGEN CAPS	WAIVER CAPS* RVP T50 T V/L=20	ETHANOL MANDATE CAPS	ASTM D4814 (MOST CURRENT)	2010 NIST HB (MOST CURRENT)	LOW-RVP WAIVER CAPS (SUMMER – SIPs)	
Arizona	Arizona	Alabama	Florida (Effective December 31, 2010)	Arkansas	Arkansas	Alabama	Birmingham (Jefferson & Shelby Counties)
Arkansas	California	Arizona	Hawaii	California	Illinois (Effective May 1, 2011)	Georgia	Atlanta
California	Michigan	Arkansas	Missouri	Colorado	Kansas	Illinois	Madison, Monroe & St. Clair Counties
Delaware	Missouri	California	Montana	Connecticut	Maine	Indiana	Clark & Floyd Counties
Florida		Colorado	Oregon	Delaware	New Hampshire	Kansas	Kansas City (Johnson & Wyandotte Counties)
Illinois (Effective May 1, 2011)		Connecticut		Illinois	Virginia	Michigan	Wayne, Oakland, Macomb, Livingston, St. Clair, Monroe, Washtenaw & Lenawee Counties
Maine		Florida		Kansas	Washington (Effective June 1, 2011)	Missouri	Kansas City (Clay, Platte & Jackson Counties)
Missouri		Georgia		Kentucky	West Virginia	Ohio	Cincinnati / Dayton (Hamilton, Butler, Warren, Clermont, Montgomery, Miami, Greene & Clark Counties)
Nevada		Illinois		Louisiana			
New Hampshire		Iowa		Maine			
New York		Kentucky		Mississippi			
North Dakota		Maine		Missouri			
Oklahoma		Maryland		Montana			
Tennessee		Michigan		Nevada			
Virginia		Mississippi		New Hampshire			
Washington (Effective June 1, 2011)		Missouri		New Mexico			
West Virginia		Nevada		New York (Suffolk County)			
Wisconsin		New Hampshire		North Carolina			
		New Mexico		Ohio (Summit County)			
		North Carolina		South Carolina			
		North Dakota		Tennessee			
		Oklahoma		Utah			
		Tennessee		Virginia			
		Utah		Washington			
		Virginia		West Virginia			
		West Virginia		Wyoming			

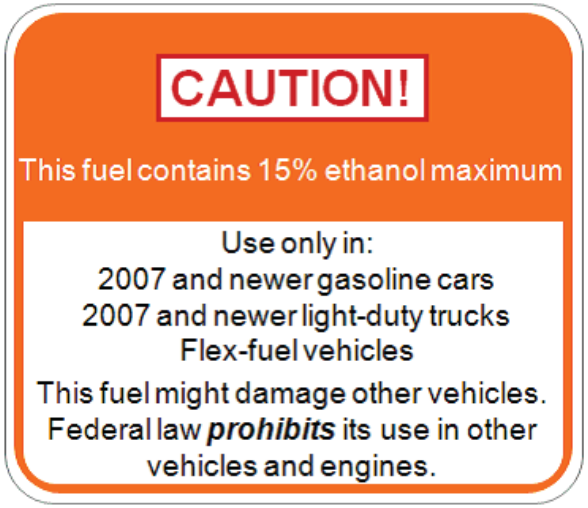
*Note: Does not include EPA RVP Waiver for Conventional Gasoline or Federal RFG

Herman & Associates – October 2010
www.HermanAssociates.com

E15 Waiver – Other Challenges Await

- Federal RFS Complex Model regulations would need to be revised – 1/3 of gasoline – proposed in waiver
- Rvp waiver for conventional gasoline during summer months would not be allowed – refiners would need to produce more expensive (lower Rvp) base gasoline
- Segregated storage and UL-approved dispensers required in most cases
- **No vehicle warranties allow ethanol blends in excess of 10 percent by volume**

E15 Waiver – Disincentives



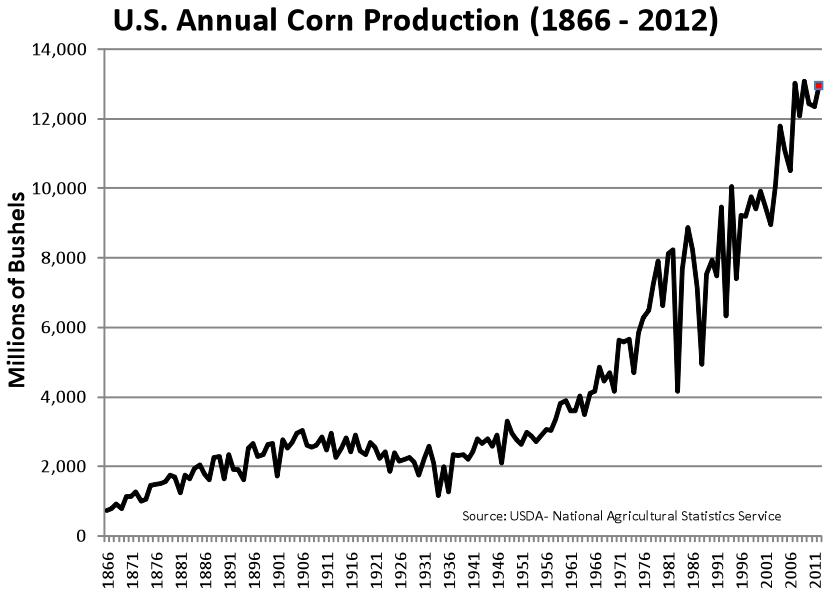
- No liability protection provided by Congress against mis-fueling & potential vehicle damage claims for vehicles prior to MY2001
- Pump labels will not be sufficient to prevent mis-fueling by consumers
- Potential benefit of lower-cost ethanol blendstock unlikely to offset increased infrastructure costs, liability exposure and limited customer base

E15 Waiver – Other Challenges Await

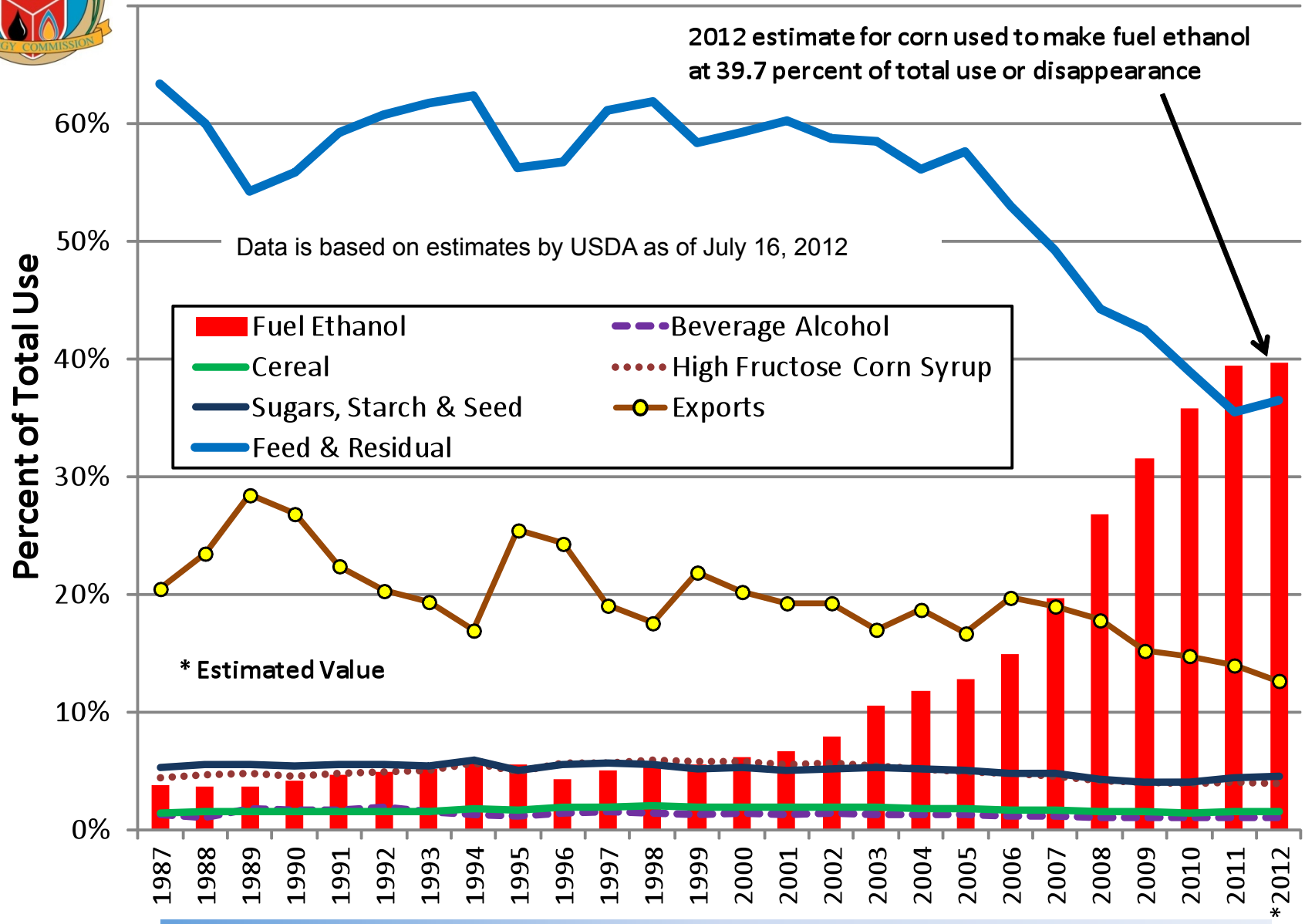
- California has its own reformulated gasoline regulations
- Predictive Model predicated on equations from CA vehicle testing of gasoline with ethanol no greater than 10 percent
- New testing of vehicles & development of new equations, assuming no deleterious emission impacts, would take time – at least three years
- Arizona & Nevada have similar challenges

Increasing Corn Costs

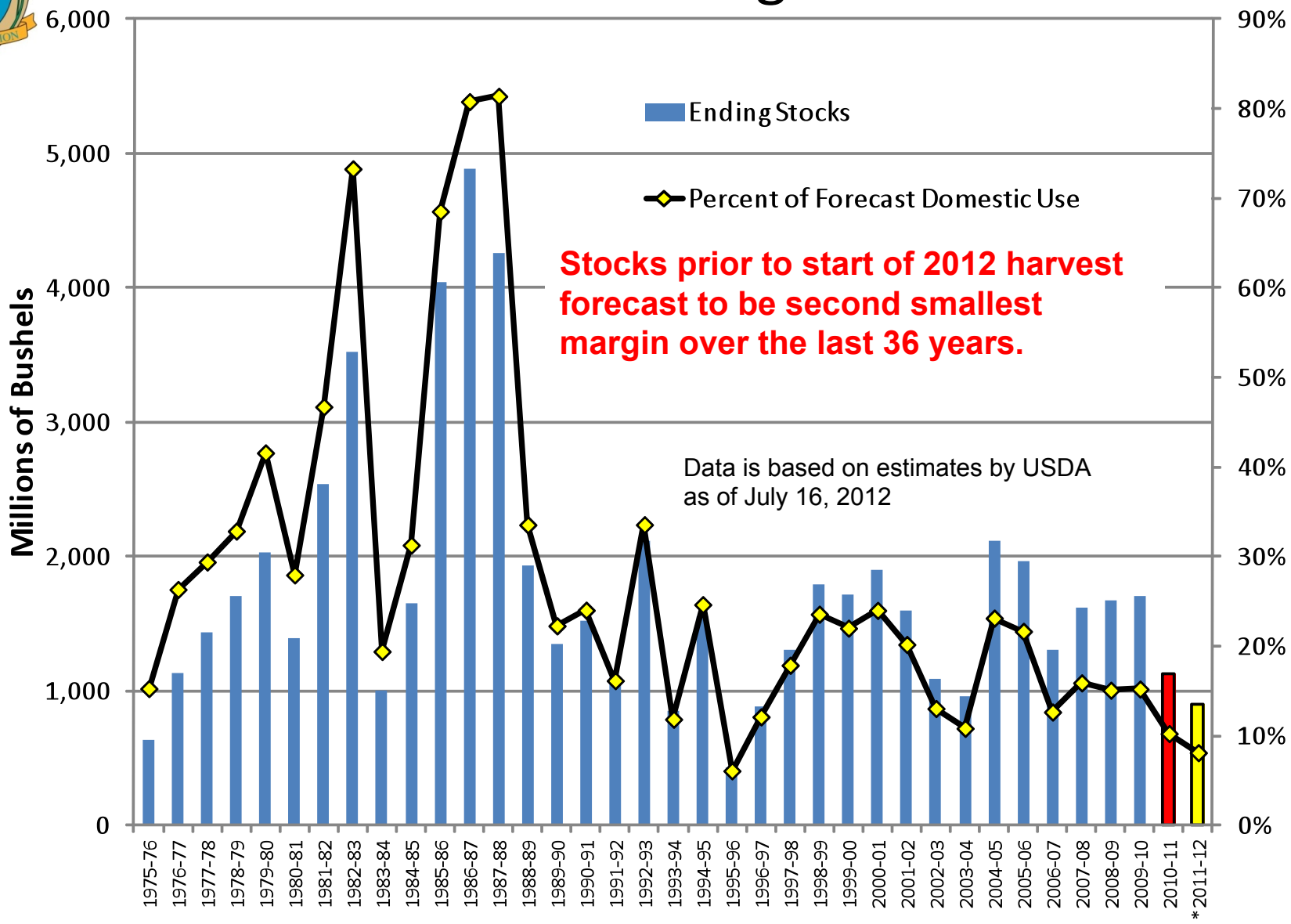
- Corn production in the United States has also been growing
  - Increased demand
  - Driven by higher ethanol use
- 2012 outlook declining
  - Robust early season projections
  - Weather conditions worsening
  - Worsening crop conditions
- Tightening supply has resulted
  - Yield & harvest volumes declining
  - Higher market-clearing prices
- Negatively impacted ethanol producers' profitability



U.S. Corn End Use – Percent of Supply



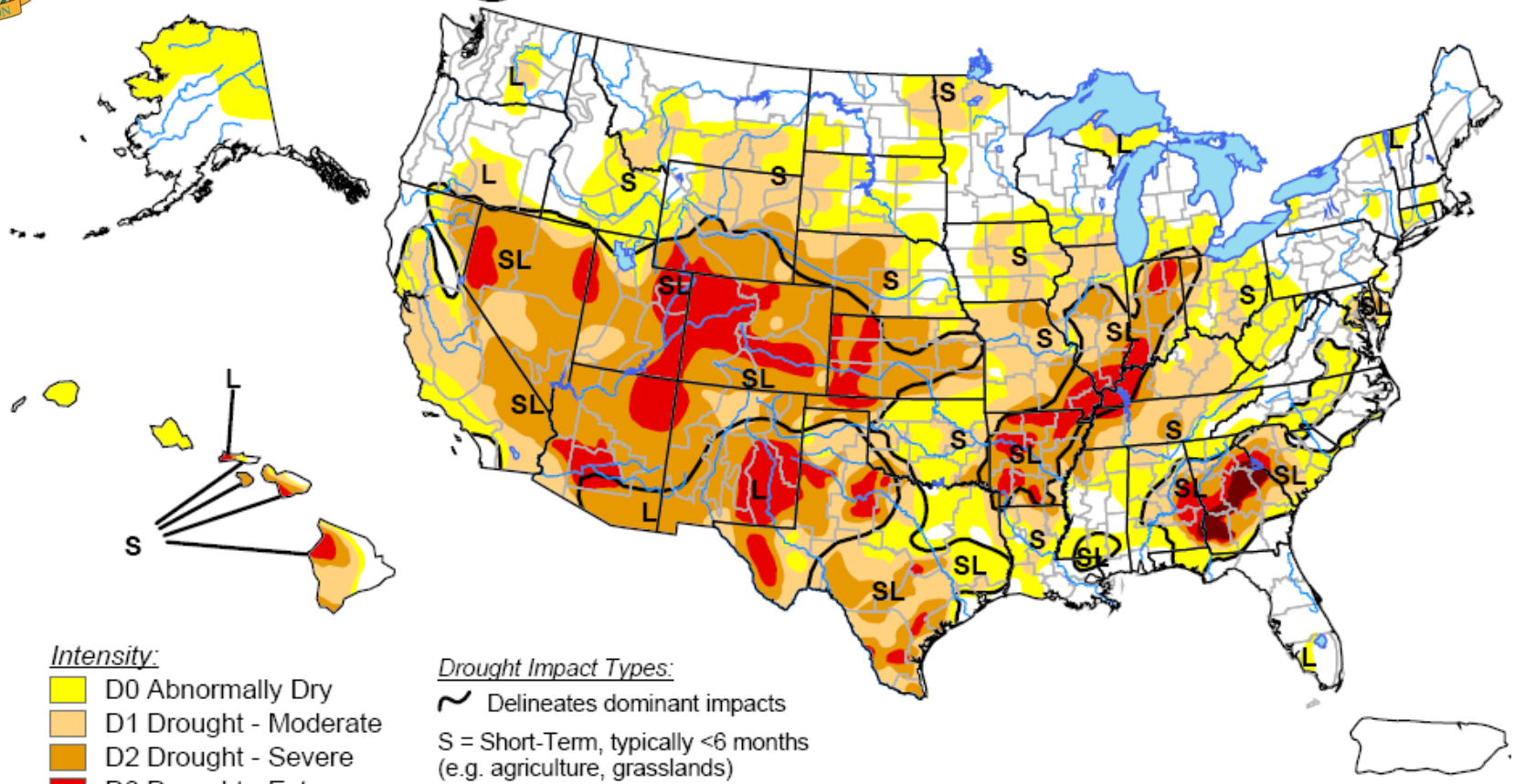
U.S. Corn Ending Stocks



Drought Continues

U.S. Drought Monitor

June 26, 2012
Valid 7 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically <6 months (e.g. agriculture, grasslands)

L = Long-Term, typically >6 months (e.g. hydrology, ecology)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

USDA National Drought Mitigation Center

Released Thursday, June 28, 2012

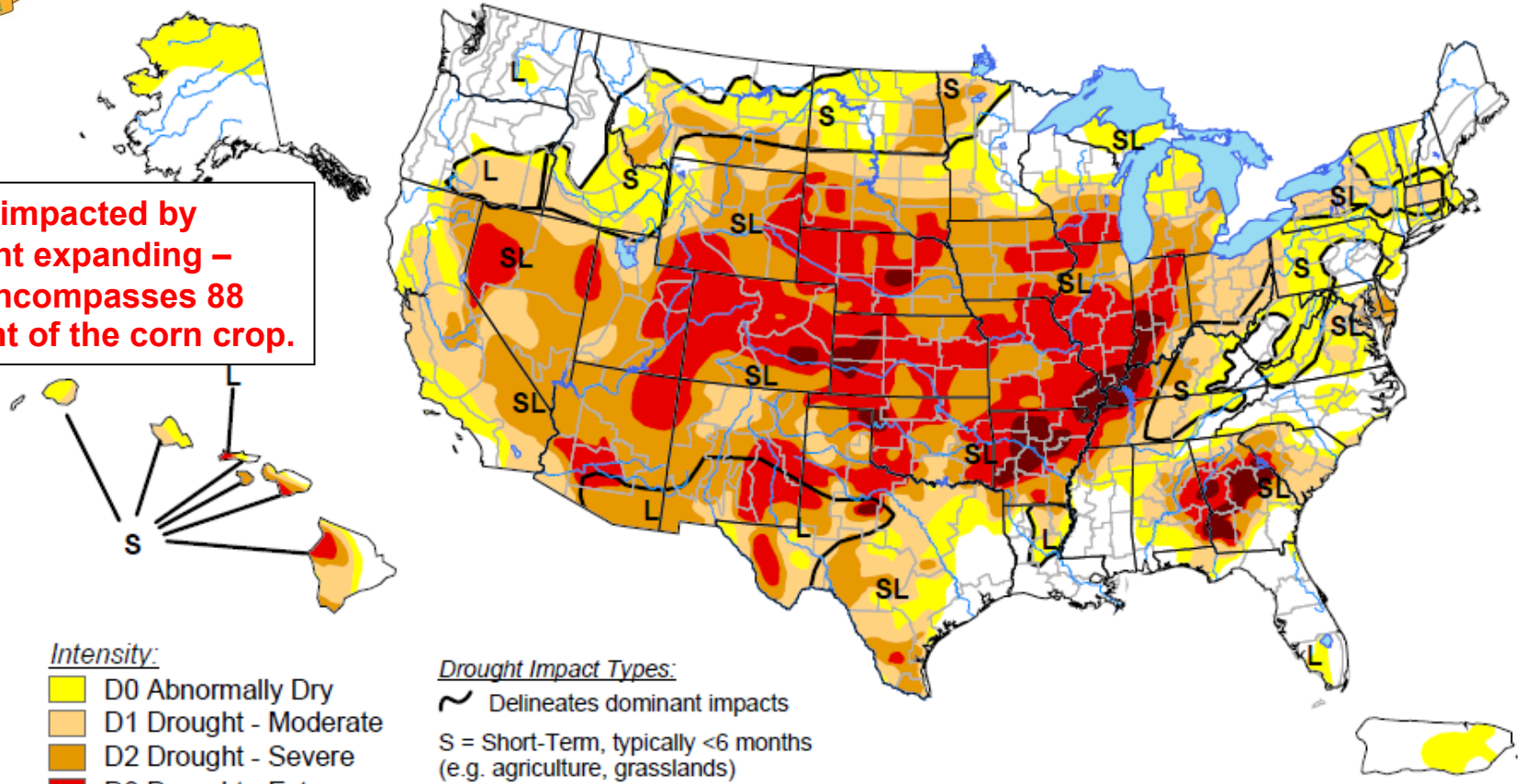
Author: Richard Heim/L. Love-Brotak, NOAA/NESDIS/NCDC

http://droughtmonitor.unl.edu/

U.S. Drought Monitor

July 24, 2012
Valid 7 a.m. EDT

Areas impacted by drought expanding – now encompasses 88 percent of the corn crop.



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
~ Delineates dominant impacts

S = Short-Term, typically <6 months (e.g. agriculture, grasslands)

L = Long-Term, typically >6 months (e.g. hydrology, ecology)

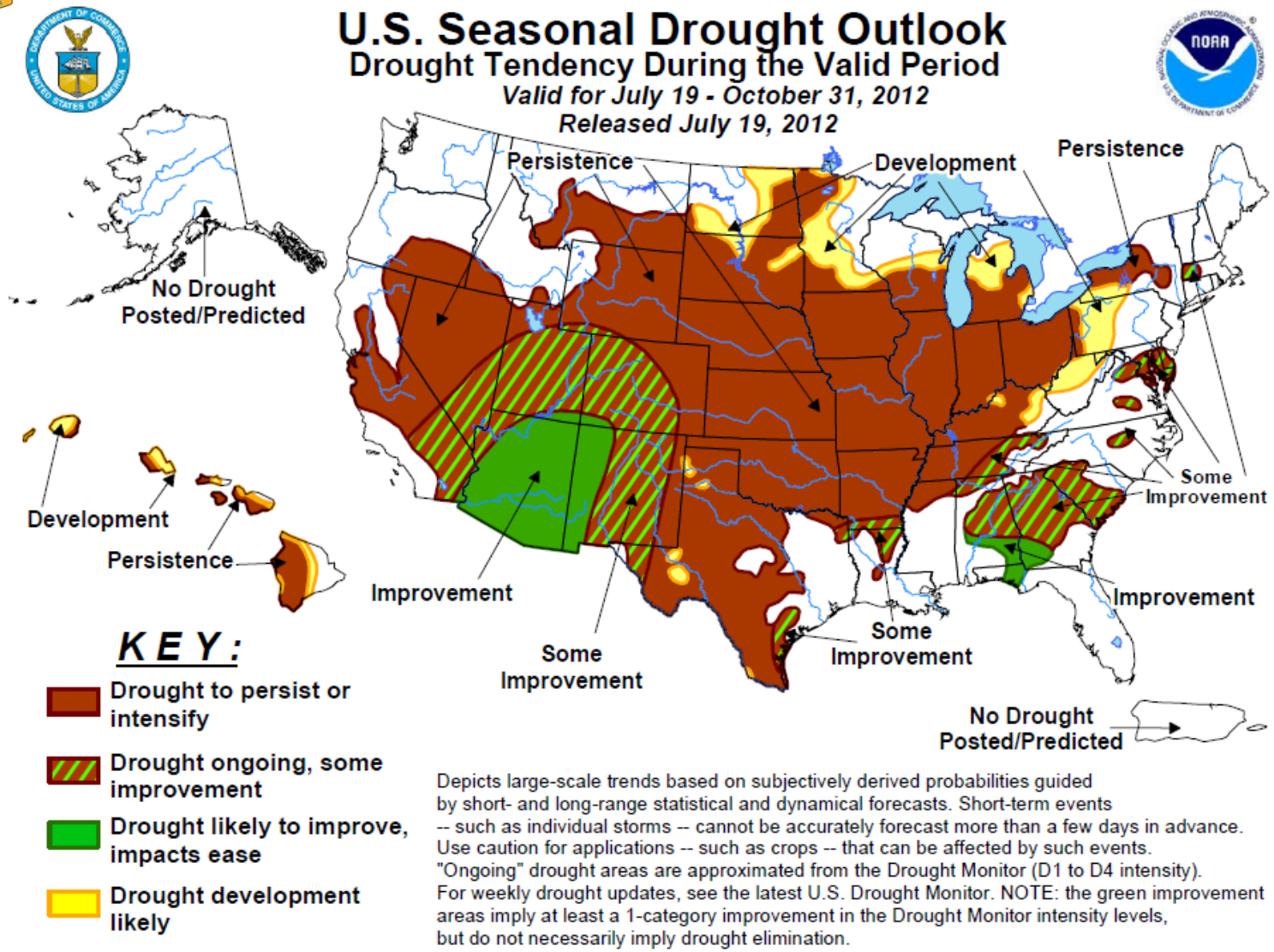
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu/

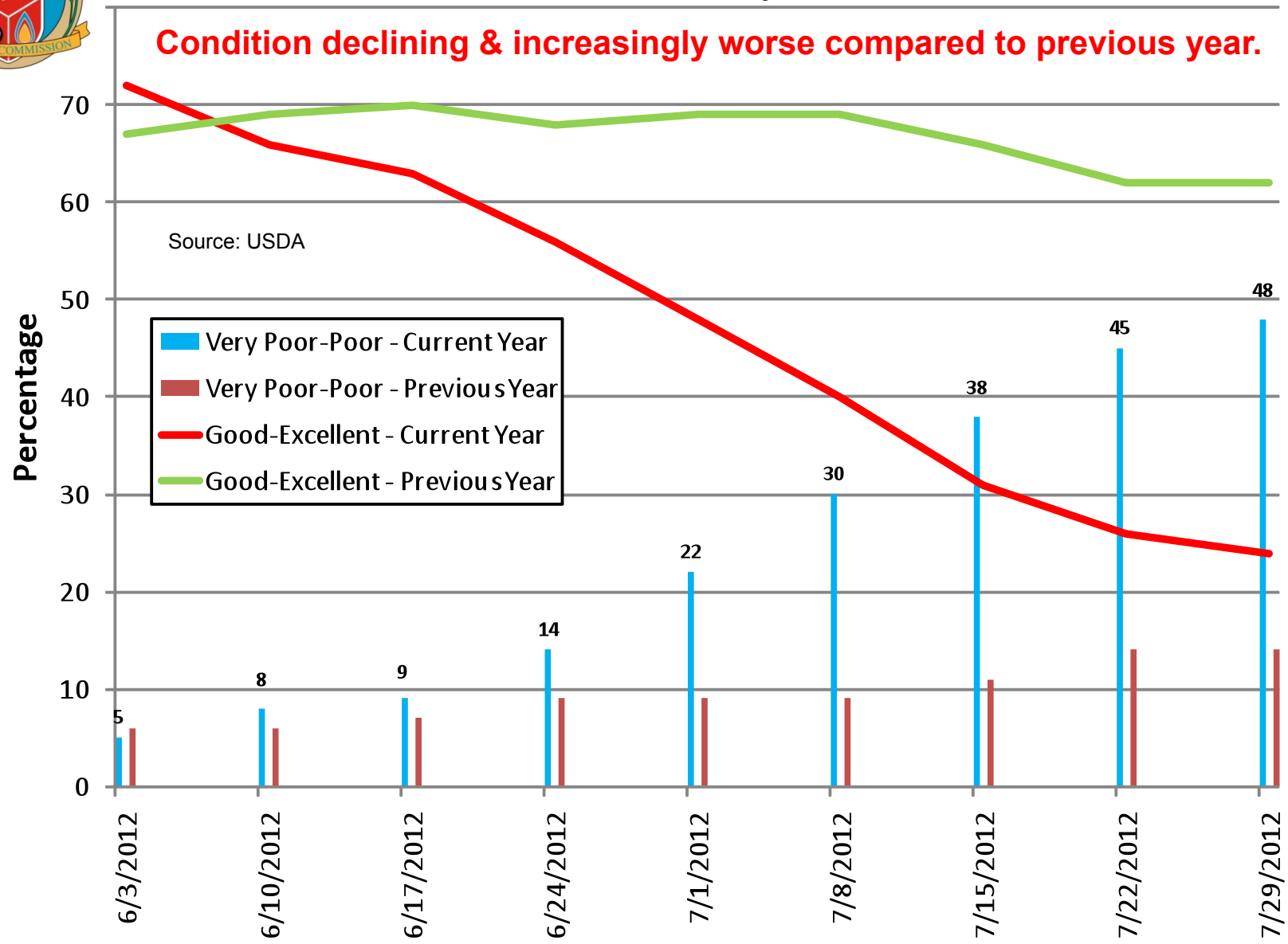
USDA | National Drought Mitigation Center | NOAA

Released Thursday, July 26, 2012
Author: Richard Heim, NOAA/NESDIS/NCDC

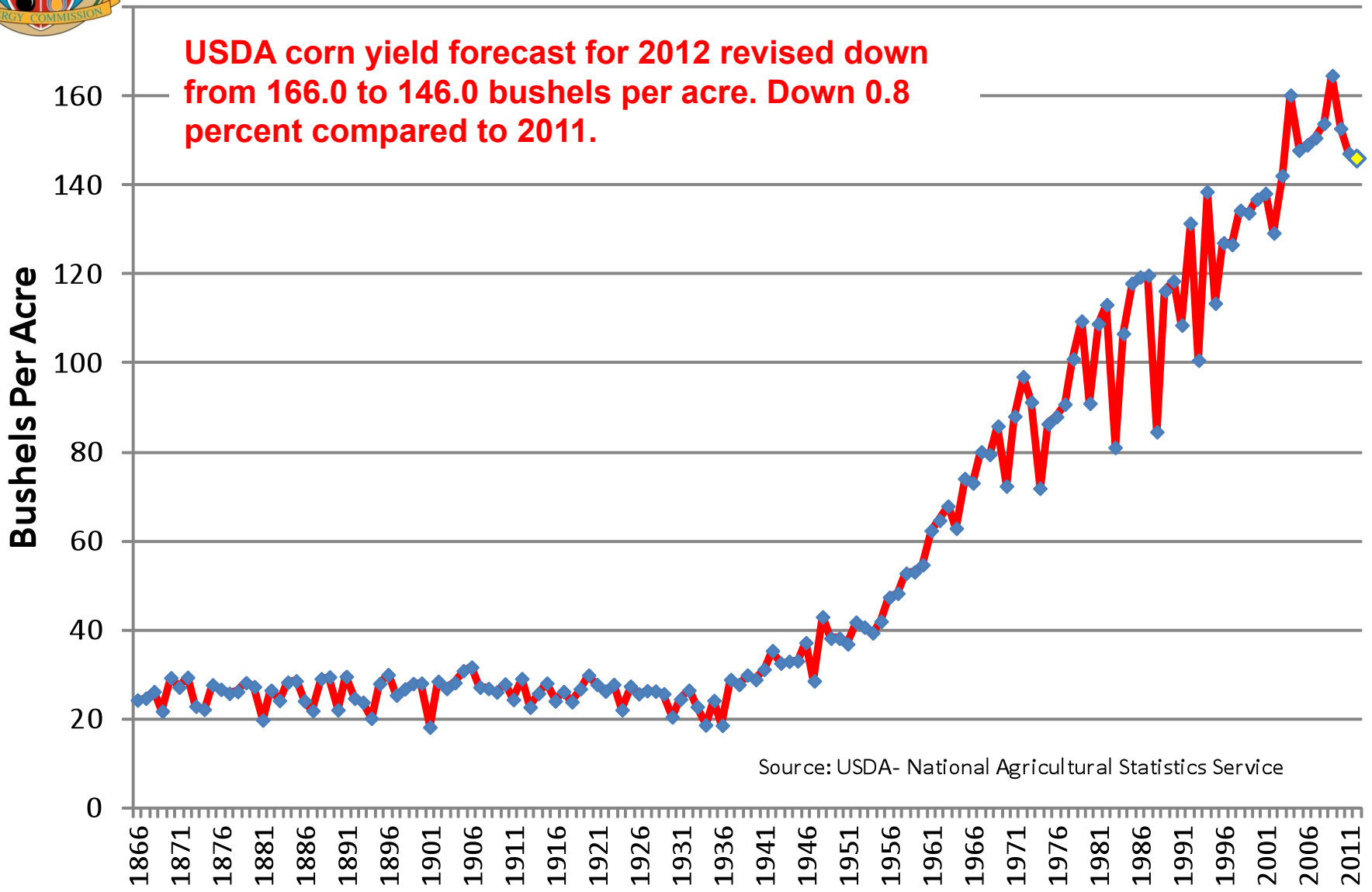
Not Much Relief in Sight



U.S. Corn Crop Condition



U.S. Annual Corn Yield (1866 - 2012)



Corn Futures Price Exceeds $8 per Bushel

Alternative and Renewable Fuel and Vehicle Technology Program - Biofuels Investments

- AB 118 Strategic Goals
  - Build capacity of California firms to produce second and third generation biofuels using advanced process technologies and waste-based and alternative feedstocks
  - Move California away from initial investments in first generation corn- and soy-based biofuels
  - Leverage knowledge, technologies and feedstocks from current biofuel production base
- Resource Potential
  - California waste-based feedstock potential for 2.7 to 3.1 billion gallons of fuel per year according to the *UC Davis California Biomass Collaborative Report*

Biofuels Investment Summary

- $108 Million in Allocations over 4 Investment Plans
  - $70.5 Million in Funding for 25 projects
- Biogas Production
  - 10 projects totaling $41.3 million
- Biodiesel and Renewable Diesel
  - 8 projects totaling $10.5 million
- Ethanol
  - 6 projects totaling $12.6 million
- CEPIP
  - 3 grants totaling $6 million

Questions?

Gordon Schremp (916) 654-4887

gordon.schremp@energy.ca.gov